

**GROUP A STREPTOCOCCAL INVASIVE DISEASE
LOS ANGELES COUNTY, 1999**

BACKGROUND

Group A Streptococcus (GAS), *Streptococcus pyogenes*, a common cause of pharyngitis and uncomplicated skin and soft tissue infections, can also cause serious invasive disease. In the late 1980s, reports of severe invasive GAS infections, including streptococcal toxic shock syndrome and necrotizing fasciitis, began to appear with increasing frequency worldwide. Various theories have been offered to explain the apparent increase and severity of streptococcal infections in recent years, including possible changes in virulence of circulating strains and changes in host susceptibility. GAS invasive disease is not a legislatively-mandated reportable disease in California. Following a cluster of severe invasive GAS infections in previously healthy children in Southern California in 1993, the Acute Communicable Disease Control Unit requested reporting of GAS invasive disease from laboratories, hospitals, and health-care providers in Los Angeles County.

METHODS

GAS invasive disease is defined as isolation of *Streptococcus pyogenes* from a normally sterile body site (blood, cerebrospinal fluid, pleural fluid, peritoneal fluid, bone, joint fluid, or from tissue collected during surgical procedures). GAS invasive disease includes three potentially overlapping clinical syndromes:

- ◆ Streptococcal toxic shock syndrome (STSS) - characterized by early shock and multiorgan system failure;
- ◆ Necrotizing fasciitis (NF) -necrosis of subcutaneous soft tissue and skin with signs of severe systemic disease;
- ◆ Sterile site infections that do not meet the clinical criteria for STSS or NF, including nonfocal bacteremia, and focal infections (e.g., meningitis, pneumonia, peritonitis, osteomyelitis, septic arthritis, and deep soft tissue infections) with or without bacteremia.

Since reporting of GAS invasive disease was initiated in 1994, surveillance methods have varied from mainly passive during 1994 and most of 1995 to county-wide active surveillance between September 1995 and July 1996. Since July 1996, the Communicable Disease Active Surveillance Project (CDAS) has conducted stimulated passive surveillance for GAS

County of Los Angeles • Department of Health Services
Acute Communicable Disease Control
Special Studies Report 1999

invasive diseases, along with several other nonmandated reportable diseases of public health importance, in approximately 60% of laboratories and hospitals in LAC.

RESULTS

In 1999, 114 cases of GAS invasive disease were reported, for a crude incidence rate of 1.2 cases per 100,000 population. Thirty-nine reports of skin/soft tissue infections were excluded because they did not meet the case definition for invasive disease. Of 62 cases for which outcome was known, there were 10 deaths, for an estimated case-fatality rate of 16%. The frequencies of total GAS invasive disease, STSS, and NF cases for years 1994-1999 are shown in Table 1.

**Table 1. Frequency of Invasive GAS, STSS, and NF
Los Angeles County, 1994-1999**

Year	Invasive GAS	STSS		NF	
		N	(%)	N	(%)
1994	83	29	(35)	18	(22)
1995	103	16	(16)	17	(17)
1996	175	9	(5)	13	(7)
1997	205	7	(3)	9	(4)
1998	128	8	(6)	13	(10)
1999	114	6	(5)	11	(10)

Focus of Infection. The majority (56%) of invasive GAS cases were bacteremia without other identified focus of infection (Table 2).

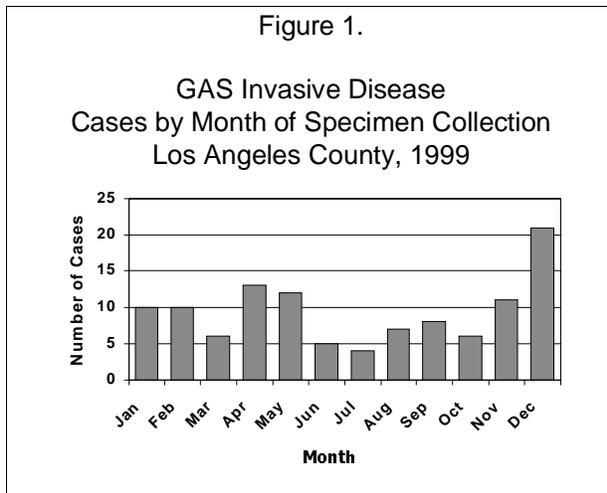
County of Los Angeles • Department of Health Services
Acute Communicable Disease Control
Special Studies Report 1999

**Table 2. Clinical Features Associated with Invasive GAS Disease Cases
Los Angeles County, 1999 (N = 114)**

Focus of Infection*	No. of patients (%)	Age (yr) Median Range	STSS No. (%)	Death No. (%)*
Total	114 (100)	58 (0-93)	6 (5.2)	10/62 (16)
Skin-soft tissue infection				
Necrotizing fasciitis	11 (9.7)	45 (13-77)	2 (18)	2/6 (33)
Other	13 (11.4)	60 (0-93)	1 (7.7)	1/8 (12.5)
Pneumonia	10 (8.8)	46 (0-64)	1 (10)	0/6 (0)
Meningitis	2 (1.8)	1, 76	0	0
Septic arthritis/osteomyelitis	12 (10.5)	66 (0-88)	0	0
Bacteremia (without septic focus)	64 (56)	60 (0-93)	2 (3)	7/28 (25)
Peritonitis	2 (1.8)	30, 46	0	0

* Calculated only for those cases with available outcome data.

Seasonality. Cases occurred throughout the year but were more frequent during the winter and spring months (Figure 1). The pronounced winter/spring seasonality commonly associated with noninvasive GAS infections, however, was not observed.



Age, Gender. The mean age of invasive GAS cases for which age data were available (n=104) was 52 years (median 58 years, range 2 months to 93 years). There were no differences between genders. Race/ethnicity data were available for 84 cases. Of these, 33 (43%) were Hispanic, 39 (46%) were non-Hispanic White, 2 (2%) were Asian, and 10 (12%) were Black.

Necrotizing Fasciitis. NF was reported in 11 (9.7%) cases; 6 (55%) of the cases were male. The mean age of NF cases was 44 years (median 45 years, range 14-77 years). Outcome was reported for 6 of the 11 NF cases with a case-fatality rate of 33% (2/6). Two

County of Los Angeles • Department of Health Services
Acute Communicable Disease Control
Special Studies Report 1999

patients with NF were also diagnosed with streptococcal toxic shock syndrome.

COMMENTS

These data are subject to several limitations. First, changes in surveillance methods over the study period make meaningful year-to-year comparisons difficult. Completeness of invasive GAS reporting in LAC has not been assessed. The national incidence rate of invasive GAS disease is estimated at 4-5 cases per 100,000 population, compared to the LAC rate of 1.2 cases per 100,000 in 1999. Second, invasive GAS surveillance is mainly laboratory-based and detailed demographic and clinical data are rarely included with the initial report. Hospital record review of reported invasive GAS cases would have provided more complete data but was done for only a small number of cases. It is likely that the number of deaths and the occurrence of additional foci of infections in bacteremic cases are substantially underestimated.

REFERENCES

1. The Working Group on Severe Streptococcal Infections. Defining the group A streptococcal toxic shock syndrome. Rationale and consensus definition. *JAMA*. 1993;269:390-1.
2. Peterson CL, Vugia DJ, Meyers HB, Chao SM, Vogt J, Lanson J, Brunell PA, Kim KS, Mascola L. Risk factors for invasive group A streptococcal infections in children with varicella: Results of a case-control study. *Ped Infec Dis J*.1996;15:151-6.
3. Vugia DJ, Peterson CL, Meyers, HB, Kim KS, Arrieta A, Schlievert PM, Kaplan EL, Werner SB, Mascola L. Invasive group A streptococcal infections in children with varicella in Southern California. *The Ped Infec Dis J*.1996;15:146-50.
4. American Academy of Pediatrics, Committee on Infectious Diseases. Severe invasive group A streptococcal infections: a subject review. *Pediatrics*. 1998;101:136-40.
5. Zurawski CA, Bardsley MS, Beall B, et al. Invasive group A streptococcal disease in metropolitan Atlanta: a population-based assessment. *Clin Infec Dis*. 1998;27:150-7.